REMARKS

The Office Action dated November 3, 2005 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1 and 24 have been amended. No new matter has been added, and no new issues are raised which require further consideration and/or search. Claims 2 and 25 have been cancelled. Claims 1, 3-24 and 26-34 are submitted for consideration.

Claims 1-34 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,268,828 to Martek. The rejection is traversed as being based on a reference that neither teaches nor suggests the novel combination of features clearly recited in independent claims 1 and 24, and claims 3-23 and 26-34 dependent thereon.

Claim 1, upon which claims 2-23 depend, recites an antenna arrangement including at least two antennas for providing radio coverage to a plurality of user equipments in a predetermined area of a mobile communications network. The at least two different antennas being arranged to have different vertical properties to thereby provide at least two different areas of radio coverage within the predetermined area, and there being provided a plurality of frequencies for use in the predetermined area, the arrangement. The antenna arrangement also includes adjusting means for dynamically adjusting transmission properties of at least one of the antennas based on a distribution of users within a cell and frequency requirements for users within the cell. The antenna arrangement further including allocating means for dynamically allocating at least one

user equipment to at least one group associated with at least one of the at least two antennas based on link characteristics of a user equipment.

Claim 24, upon which claims 25-34 depend, recites a method of controlling an antenna arrangement including at least two antennas for providing radio coverage to a plurality of user equipment in a predetermined area of a mobile communications network. The method includes the steps of arranging at least two different antennas to have different vertical properties to thereby provide at least two different areas of radio coverage within the predetermined area. The method also includes the steps of dynamically adjusting transmission properties of at least one of the antennas based on a distribution of users within a cell and frequency requirements for users within the cell and dynamically allocating each user equipment to at least one group associate with at least one of the at least two antennas based on link characteristics of a user equipment.

As will be discussed below, the cited prior art reference of Martek fails to disclose or suggest the elements of any of the presently pending claims.

Martek teaches that an antenna providing transmit, receive or both, is constructed as a series of antenna dipole columns mounted in close proximity to the outer surface of a nearby vertical conical shaped electrical ground surface. The ground surface is constructed circumferentially around a mast and the conical "slope" and is such that the ground surface faces downward at an angle, thereby creating on the ground a circumference within which the signal is propagated. Col. 4, lines 10-25, Col. 8, lines 7-46. Martek, therefore, discloses that an antenna is formed around a downward facing

cone, comprised of columns of individual antenna elements. These columns of elements can be driven in such a way (by controlling the relative phases of the signals in the element) so as to "beam-form" the beam produced by the overall antenna. The beam-forming can also be done to produce a down-tilted beam by shifting the phase of the lower elements in a column, relative to upper elements.

Applicant submits that Martek simply fails to teach or suggest each element of the presently pending claims. Claim 1, in part, recites an antenna arrangement including at least two antennas being arranged to have different vertical properties to thereby provide at least two different areas of radio coverage within the predetermined area. Claim 24, in part, recites arranging at least two different antennas to have different vertical properties to thereby provide at least two different areas of radio coverage within the predetermined area. The Office Action alleges that figure 9 of Martek discloses this feature of claims 1 and 24. Specifically, the Office Action alleges that column 16, lines 41-50 of Martek discloses that the upper and lower groups of antenna elements form an upper and lower "phase center," and that this constitutes two antennas. Applicant agrees that the upper and lower groups of elements can be considered to be two antennas. However, Applicant strongly refutes that these two antennas can be used in the system shown in figure 9 of Martek to "provide at least two different areas of radio coverage within the predetermined area" as recited in claims 1 and 24.

Applicant submits that while the two antennas of Martek produce two "phase-centers", this does not mean that two separate beams are produced by the antennas.

Rather, in Martek, only one single overall beam is produced by the two antennas, and it is this one single beam that can be elevation steered. This can be understood by referring to the circuit components connected to the antenna elements in figure 9 of Martek. As is clearly shown, the upper and lower groups of elements are fed with <u>the same signal,</u> as indicated by the single connector labeled 15a in figure 9 of Martek. Then, as discussed on column 13, lines 24-37 of Martek, the signal is evenly split between the upper and lower elements by Wilkinson splitter 510. The remaining circuit components for the upper and lower elements are then identical, except that the lower elements are phase shifted by phase shifter 530a.

Thus, Applicant submits that it is clear that, in Martek, exactly the same signals are applied to the upper and lower elements, except for a phase shift. The radiation produced by the antenna elements of Martek when in close proximity in this manner, but phase shifted related to each other, allows a single overall beam to be produced by the array, which is steerable by controlling the relative phase shift. Column 13, lines 37-42 of Martek clearly states that "the object is that energy enters a connecter, such as connector 15a, and is supplied to a select number of antenna columns … such that a predetermined phase progression is provided to form <u>a desired antenna beam.</u>" Applicant submits that the principle of phased-array antennas is known to those skilled in the art and may be further understood with reference to "The New IEEE Standard Dictionary of Electrical and Electronic Terms" 5th Edition, 1993, page 941 (enclosed herewith) where it is stated that a phased array antenna is "an array antenna whose <u>beam direction</u> or

radiation pattern is controlled primarily by the relative phases of the excitation coefficients of the radiating elements."

Hence, Applicant asserts that it should be clear that the upper and lower arrays, in Martek, are driven with the same signal to produce one overall beam, the elevation of which can be controlled. As only one signal overall beam is produced by the two antennas of Martek, Martek cannot be said to provide at least two different areas of radio coverage as recited in the presently pending claims. Therefore, Martek simply does not teach or suggest the at least two different antennas being arranged to have different vertical properties to thereby provide at least two different areas of radio coverage within the predetermined area" as recited in claims 1 and 24.

Furthermore, claims 1 and 24 also recite, in part, allocating means for dynamically allocating at least one user equipment to the at least one group associated with at least one of the two antennas based on link characteristics of a user equipment. As discussed above, the upper and lower arrays of Martek are fed with a single signal through connecter 15a. Martek does not teach or suggest a circuitry in figure 9 that can manipulate the signals such that the signal for one particular user equipment is directed to either the upper or lower arrays. Therefore, the signals for a user equipment are always emitted from both the upper and lower arrays (which is seen as one overall beam, as discussed above). Hence, allocating means are completely redundant in Martek, as there is no possibility to allocate a user equipment to be associated with either antenna.

In addition, claims 1 and 24 recite, in part, adjusting means for dynamically adjusting transmission properties of at least one of the antennas based on a distribution of users within a cell and the frequency requirements for users within the cell. The only possible means for adjusting the transmission properties of an antenna in Martek is the phase shifter 530a of figure 9, which adjusts the elevation of the single overall beam produced by the upper and lower arrays. There is simply no teaching or suggestion in Martek in which the transmission properties could be adjusted based on the frequency requirement for users within the cell. Applicant submits that since the upper and lower antennas are fed with the same signal, it is impossible in the system in Martek to have different frequencies transmitted from the upper and lower antennas, which therefore teaches away from any need to consider the frequency requirements of the users. Based on the reasons presented above, Applicant respectfully asserts that the rejection under 35 U.S.C. §103(a) should be withdrawn because Martek simply fails to teach or suggest each feature of claims 1 and 24 and hence, dependent claims 3-23 and 26-34 thereon.

As noted previously, claims 1, 3-23 and 26-34 recite subject matter which is neither disclosed nor suggested in the prior art references cited in the Office Action. It is therefore respectfully requested that all of claims 1, 3-23 and 26-34 be allowed and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by

telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

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Enclosure: The New IEEE Standard Dictionary of Electrical and Electronic Terms" 5th Edition, 1993, page 941

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and amplitude-comparison. *See:* **monopulse; amplitude-comparison monopulse.** 686-1982

phase-comparison protection (power switchgear). A form of pilot protection that compares the relative phase-angle position of specified currents at the terminals of a circuit. C37.100-1981

phase conductor (alternating-current circuit). The conductors other than the neutral conductor. *Note:* If an alternating-current circuit does not have a neutral conductor, all the conductors are phase conductors. 270-1966w

phase connections (rotating machinery). The insulated conductors (usually arranged in peripheral rings) that make the necessary connections between appropriate phase belts in an alternating-current winding. *See:* **rotor (rotating machinery); stator.** [9]

phase constant (1) (fiber optics). The imaginary part of the axial propagation constant for a particular mode, usually expressed in radians per unit length. *See:* **axial propagation constant.** 812-1984
(2) (waveguide). Of a traveling wave, the space rate of change of phase of a field component (or of the voltage or current) in the direction of propagation, in radians per unit length. 146-1980w
(3) (β) (radio-wave propagation). The magnitude of the phase vector. 211-1990

phase constant. The imaginary component of the propagation constant. This is the spatial rate of decrease of phase of a field component in the direction of propagation in radians per unit length. 1004-1987

phase contours. Loci of the return transfer function at constant values of the phase angle. *Note:* Such loci may be drawn on the Nyquist, inverse Nyquist, or Nichols diagrams for estimating performance of the closed loop with unity feedback. In the complex plane plot of $KG(j\omega)$, these loci are circles with centers at $-1/2, j/2N$ and radiuses such that each circle passes through the origin and the point $-1, j0$. In the inverse Nyquist diagram they are straight lines $\gamma = -N(x + 1)$ radiating from the point $-1, 0$. *See:* **Nichols chart; Nyquist diagram; inverse Nyquist diagram.** [120]

phase control (1) (rectifier circuits). The process of varying the point within the cycle at which forward conduction is permitted to begin through the rectifier circuit element. *Note:* The amount of phase control may be expressed in two ways: (1) the reduction in direct-current voltage obtained by phase control or (2) the angle of retard or advance. [62]
(2) (thyristor). The starting instant is synchronous with respect to the line voltage. The controller ON-state interval is equal to or less than half the line period. 428-1981

phase control range (thyristor). The range over which it is possible to adjust the angle of retard expressed in electrical degrees. 428-1981

phase converter (rotating machinery). A converter that changes alternating-current power of one or more phases to alternating-current power of a different number of phases but of the same frequency. *See:* **converter.** [9]

phase-corrected horn. A horn designed to make the emergent electromagnetic wave front substantially plane at the mouth. *Note:* Usually this is achieved by means of a lens at the mouth. *See:* **circular scanning; waveguide.** [35], [84]

phase correction (telegraph transmission). The process of keeping synchronous telegraph mechanisms in substantially correct phase relationship. *See:* **telegraphy.** [119]

phase corrector. A network that is designed to correct for phase distortion. *See:* **network analysis.** 270-1966w

phase-crossover frequency (hydraulic turbines). The frequency at which the phase angle reaches 180 degrees. 125-1977

phased-array antenna. An array antenna whose beam directon or radiation pattern is controlled primarily by the relative phases of the excitation coefficients of the radiating elements. *See:* **antenna.** 145-1983

phase delay (1) (facsimile) (in the transfer of a single-frequency wave from one point to another in a system). The time delay of a part of the wave identifying its phase. *Note:* The phase delay is measured by the ratio of the total phase shift in cycles to the frequency in hertz. *See:* **facsimile transmission.** 168-1956w
(2) (relaying). An equal delay of both the leading and trailing edges of a locally generated block. C37.100-1981
(3) (dispersive and nondispersive delay lines). The ratio of total radian phase shift, to the specified radian frequency, w. Phase delay is nominally constant over the frequency band of operation for nondispersive delay devices. *See:* **phase lag.** [22]

phase delay time. In the transfer of a single-frequency wave from one point to another in a system, the time delay of a part of the wave identifying its phase. *Note:* The phase delay time is measured by the ratio of the total phase delay through the network, in cycles, to the frequency, in hertz. *See:* **measurement system.** 285-1968w, [38]

phase deviation (1) (angle modulation) (phase modulation). The peak difference between the instantaneous angle of the modulated wave and the angle of the carrier. *Note:* In the case of a sinusoidal modulating function, the value of the phase deviation, expressed in radians, is